

# The Gold Standard for single tooth replacement?

Accreditation Case Type 3  
Tooth replacement

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## Introduction and chief complaint

This new patient attended complaining of a missing front tooth and an acrylic 'flipper' partial denture replacing it. She wanted a more permanent fixed replacement for this tooth.

The debilitating effects of missing a front tooth can be seen in the pre-operative full face picture (*Figure 1*). Whilst historically either a removable option or bridgework would have been the only treatment options, with the advent of dental implants we now have what could be considered the gold standard for replacing a single missing tooth.

## Medical history

The patient's medical history was unremarkable

## Dental history

Tooth 11 was lost after failure of a post-retained crown that was placed following injury to this tooth as a child.

## Examination, Diagnosis and Treatment Plan

A comprehensive dental examination was carried out.

The patient was aware of the mild anterior crowding with misalignment of 43, but she was not concerned enough about it to consider treatment. Her periodontal condition was fair with some mild plaque-induced gingivitis and mild bleeding on probing, mostly in the posterior interdental areas.

There were some old posterior amalgams present but again, the patient elected not to have these treated at this time. The restorations showed some marginal discolouration but no caries was evident. There was early occlusal fissure caries in 47.

Following the examination and discussion of various options, her treatment plan was agreed as follows:

1. Periodontal care to treat the mild gingivitis

2. Composite sealant restoration 47
3. Combined power and home whitening
4. Implant abutment placement and provision of a temporary crown for 'tissue training' at 11
5. Final crown placement 11

## Clinical treatment

After periodontal care with the practice hygienist, impressions were taken for a diagnostic wax up and the laboratory was advised to match the contour of 11 to 21. A stent was produced by the laboratory to guide the implant placement by a specialist colleague. A Nobel Biocare replace select regular platform implant was placed in the desired position using the stent supplied to the implant surgeon. The patient continued to wear her partial flipper denture.

One week prior to implant exposure the patient had power whitening using the Zoom system. Custom fitted home whitening trays were used to complete the whitening using Carbamide peroxide (Discus Dental).



Figure 1: a-b – Full face: Before (left) and after (right) images of the case

Figure 2: a-f – Smile: *Before (left) and after (right) images of the case*



Following the healing period and after confirming satisfactory soft tissue healing, a fixture head impression was recorded using addition cured vinyl polysiloxane material. No local anaesthetic was required for this impression. A

radiograph was taken to confirm that the impression post was fully seated and the laboratory was instructed to pour this impression and construct a soft tissue model as well. The technician was asked to construct the final custom abutment with the

margins of this abutment approximately 1 mm sub-gingival and also to construct a temporary crown coping and final crown coping. The temporary coping was made from Luxatemp and the final coping scanned to get a Procera

Figure 3: a-f – Further images of the case: *Before (left) and after (right)*



crown coping constructed. By constructing the temporary and final crown copings in the laboratory on the final abutment it means it is not necessary to use any retraction cord to record the final margins placed by the lab on the implant abutment

even though these will be somewhat subgingival. This means that there is less risk of inducing traumatic gingival recession from the retraction cord and at the same time greater accuracy is ensured.

The abutment was torqued into place at 35 Newton centimetres after a check radiograph to confirm complete seating of the abutment and a temporary filling material placed in the screw access hole. It is my preference to use cement-

Figure 4: a-f – Retracted: *Before (left) and after (right) images of the case*



retained crowns particularly in the aesthetic zone. Finally, a temporary crown was constructed chair-side using Luxatemp1/3 bleaching light and 2/3rds B1 on the lab made temporary coping. This was made using a putty matrix of the wax-up.

This was then made concave in the gingival crevice region to encourage soft tissue migration incisally and ensure the correct gingival architecture – a technique known as ‘tissue training’.

Once I was happy with the final gingival architecture, final impressions were taken in an addition-cured vinyl polysiloxane and the permanent Procera coping picked up in the master impression. Face bow records, an opposing arch

Figure 5: a-f – Left side view, upper and lower occlusal views: *Before (left) and after (right) images of the case*



impression and bite records were also taken, along with final photographs to assist the ceramist. The patient also visited the ceramist for custom shade matching. If this had not been possible then more photographs would have been taken

with shade tabs in place to aid the ceramist with the colour matching process. The ceramist was instructed to copy the contours of the temporary crown as this had been contoured in the patient's mouth to accurately match the other central.

The crown was returned for a biscuit bake try-in to allow for refinement of the occlusion and confirm the correct contours. The patient then attended the ceramist for a final 'custom finish'. Once the patient and

I were satisfied, the crown was cemented using a permanent, resin-modified glass ionomer cement (GC Fuji Cem), with good 'clean-up' properties. The latter helps ensure that no cement remains sub-gingivally. Whilst this cement can expand by up to 0.5%, the process coping can withstand this expansion.

## Conclusion

Whilst colour matching a single central incisor can be a challenge in itself, the added challenge of ensuring the correct gingival architecture around an anterior implant makes the replacement of a single missing central incisor one of the toughest challenges facing us as modern dental professionals. However, with good interdisciplinary skills and communication between restorative dentist, implant surgeon and ceramist, great results can be achieved as demonstrated by this case.

## Armamentarium

- Nikon D100 Digital camera with macro capability
- Retractors and mirrors (Photomed Industries)
- Schick CDR Digital radiography system (Schick Industries)
- Dental loupes x2.2 magnification (Orascoptic)
- Impression coping regular platform (Nobel Biocare)
- Denar Slidematic Facebow (Teledyne; Prestige)
- Blu mousse bite-registration material (Prestige)
- Coop8 seminars preparation and polish kits (Brasseler Komet)
- Front-surface reflecting dental mirror (Claudius Ash)
- Silicone impression material (Honigum, DMG)
- Alginate (Henry Schein)
- Rimlock metal impression trays (Prestige Dental)
- Eezitray stock impression trays (Henry Schein)
- GC Fuji cem (GC Corporation)
- Bis-acrylic provisional crown material (Luxatemp, DMG)
- Luxaglaze (DMG)
- Benda Brushes (Centrix)
- Disposable plastic Dappens dishes
- Flowable composite resin (Revolution- Kerr)
- Halogen curing light (Bisco VIP light) - 11 mm diameter curing light tip (Kerr)
- Soflex ET contouring and polishing discs (3m ESPE)
- Ultrafine rotary diamond burs (Brasseler Komet)
- Silicone porcelain polishing kit (Ceramiste; Shofu)
- Aluminium oxide impregnated rubber polishers (Flexipoint and Flexicups, blue and pink; Cosmodent)
- Diamond polishing paste (Luminescence; Premier)
- Rubber polishing cups for contra-angled handpiece
- Epitex finishing strips (GC Industries)
- Dental floss
- Interdental brushes (Tepe)
- Accu film II articulating foil, black and red (Parkell)
- Miller's forceps
- Shimstock foil
- Straight probe and Williams probe
- Tweezers, flat plastic and excavator
- Cotton wool rolls and gauze 2x2 squares

## Acknowledgements

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## Further reading

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